

Dr. Theodore Thomson's Report to the Local Government  
Board on Epidemic Measles in the Borough of Lancaster.

RICHARD T. THORNE,  
Medical Officer,  
*January 24th, 1898.*

In the month of May last, on receipt of the Registrar General's Quarterly Return, the attention of the Board was attracted by the fact that there had occurred an exceptionally heavy mortality from measles in the Borough of Lancaster during the first quarter of 1897. Correspondence hereon arose between the Board and the Town Council on the subject of this measles epidemic; and, in view of the fact that the disease still persisted in the district, I was instructed, on July 13th, to make inquiry into the circumstances in which measles had been so fatally prevalent in Lancaster. This I did in the course of the ensuing week, ascertaining the facts now set forth in this report.

The Borough of Lancaster had, at the census of 1891, a population of 31,038 persons, occupying 5,483 houses; at the middle of the present year its population is estimated by the Medical Officer of Health to have risen to 38,228. It covers an area of 1,577 acres, and has a rateable value of £139,368. The town may be regarded as consisting of an older portion, which lies around and at the base of the eminence on which Lancaster Castle stands, and of a newer portion spreading from the older on all sides, but extending more especially in a southerly direction. The older portion of the town shows not a few instances of houses huddled together in a fashion depriving them of proper light and air-space; while the back streets and yards are often indifferently paved, and less clean than is desirable. In the newer parts of Lancaster, on the other hand, the above conditions—air-space, light, paving, and cleanliness—are distinctly superior to those in the older parts of the town. Working-class houses in newer Lancaster have usually two rooms and a scullery on the ground floor, and two or three bed-rooms on the upper floor; in older Lancaster, accommodation in houses of this class is scantier. The prevailing system of excrement-disposal is by water-carriage, the town being sewered throughout. House refuse is stored in brick ashpits, and is removed periodically by the Town Council as Sanitary Authority. The town has a public water supply, derived, it is said, from the Millstone Grit of Wyre Fell, some nine miles from Lancaster.

The more recent history of Lancaster as regards measles may be gathered from the following figures, which show the number of deaths referred to that disease and the number of cases that came to the knowledge of the Sanitary Authority year by year during the eight years, 1889 to 1896:—

Year.	Number of deaths referred to measles.	Number of cases of measles known to the Sanitary Authority.
1889	75	1,315
1890	4	91
1891	3	111
1892	18	752
1893	16	609
1894	—	46
1895	20	1,405
1896	2	58
1889-96	138	4,387

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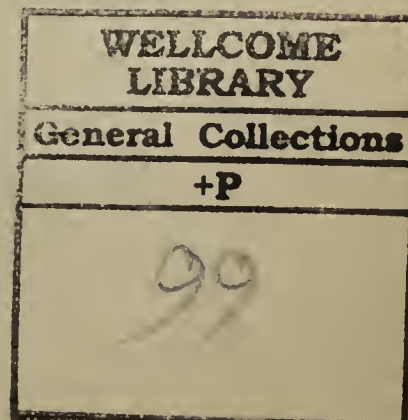
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If 33,000 be accepted as representing the mean population of Lancaster during the eight years, 1889-96, it appears that the death rate annually from measles per 1,000 persons living during this period was 0·52. This is in excess of the average annual death rate from the same cause in England as a whole during the five years, 1891-95, which was 0·41 per 1,000 persons living. The annual death rate from measles during the same five years in the 33 large towns was 0·60 per 1,000 persons living; while in the 67 other large towns it was 0·44 per 1,000 persons living during the three years, 1894-96 \*

From the figures in the table it appears also that the yearly rate of attack by measles in Lancaster during the eight years, 1889-96, was nearly 17 per 1,000 persons living.

The epidemic of measles with which this Report has concern may be regarded as having commenced in December, 1896. During the month of November of that year no case is known to have occurred in Lancaster, and during the previous ten months there had been not more than 38 known cases of measles, scattered irregularly over that period. On December 5th, a child was notified to the Authority as attacked by measles, and this was followed by the notification of four further cases within a fortnight. Several more cases were notified to the Authority towards the end of December, after which the disease increased with rapidity.

The following figures show the cases of measles that came to the knowledge of the Sanitary Authority from December 5th, 1896, to July 15th, 1897. During December, 1896, they are set out according to the dates on which they were made known to the Authority; after that month they are arranged in weekly periods:—

On December 5, 1896	...	...	...	...	...	...	1
" 16	"	...	...	...	...	...	1
" 17	"	...	...	...	...	...	1
" 18	"	...	...	...	...	...	2
" 24	"	...	...	...	...	...	1
" 28	"	...	...	...	...	...	2
" 29	"	...	...	...	...	...	3
" 30	"	...	...	...	...	...	4
" 31	"	...	...	...	...	...	5
During the week ending January 7, 1897	...	...	...	...	...	...	14
" " " 14	"	...	...	...	...	...	72
" " " 21	"	...	...	...	...	...	70
" " " 28	"	...	...	...	...	...	107
" " February 4	"	...	...	...	...	...	112
" " " 11	"	...	...	...	...	...	138
" " " 18	"	...	...	...	...	...	116
" " " 25	"	...	...	...	...	...	123
" " March 4	"	...	...	...	...	...	61
" " " 11	"	...	...	...	...	...	54
" " " 18	"	...	...	...	...	...	40
" " " 25	"	...	...	...	...	...	33
" " April 1	"	...	...	...	...	...	23
" " " 8	"	...	...	...	...	...	15
" " " 15	"	...	...	...	...	...	7
" " " 22	"	...	...	...	...	...	16
" " " 29	"	...	...	...	...	...	32
" " May 6	"	...	...	...	...	...	19
" " " 13	"	...	...	...	...	...	20
" " " 20	"	...	...	...	...	...	22
" " " 27	"	...	...	...	...	...	7
" " June 3	"	...	...	...	...	...	5
" " " 10	"	...	...	...	...	...	19
" " " 17	"	...	...	...	...	...	3
" " " 24	"	...	...	...	...	...	15
" " July 1	"	...	...	...	...	...	8
" " " 8	"	...	...	...	...	...	6
" " " 15	"	...	...	...	...	...	8

Total, December 5th, 1896—July 15th, 1897 ... 1,185

It appears from these figures that after occurrence of a score of cases in December, of which the last four days of the month show more than half, there

\* No statistics are available as to these 67 towns prior to 1894.





ensued rapid increase of the disease, which attained its greatest height in the month of February. Early in March the epidemic began to wane : the number of known cases decreasing at first rapidly, afterwards more slowly, so that, when I visited Lancaster in July, measles had for some time ceased to be regarded as epidemic, although the district was not even then free from the disease.

The total number of deaths in Lancaster referred to measles between December 5th, 1896, and July 15th, 1897, was 51.

#### ACTION OF THE TOWN COUNCIL.

##### 1. *Measures adopted with a view to obtaining information as regards occurrence of Measles in their district.*

(a.) *Compulsory Notification.*—In 1888 measles became compulsorily notifiable in Lancaster by virtue of a provision of the Lancaster Corporation Act, 1880, in which it is enacted that due notice shall be given to the Corporation of persons within the borough suffering from any infectious disease : while “infectious disease” is defined as meaning certain diseases specified in the Act, and also “such other diseases as the Corporation . . . . . may from time to time declare to be infectious or contagious.” In 1888, the Corporation passed a resolution that measles be declared an infectious disease for a period of three years : and an order made by the Corporation to this effect received the Board’s approval, as required by the terms of the Act. In March, 1892, this order was, with the Board’s consent, renewed for a further period of three years : but was not renewed in 1895 or subsequently. Consequently measles has not been compulsorily notifiable in Lancaster since March, 1895. Nevertheless the disease has continued to be notified in Lancaster. Notification, under the local Act referred to, is dual. Medical practitioners notifying cases of infectious disease in accordance with the provisions of the Act receive two shillings and sixpence for every certificate : with, however, this reservation, that “only one fee shall become payable within an interval of thirty days to the same medical practitioner for certificates given by him in respect of the same disease occurring in the same building.”

With a view to securing notification by the householder in those instances where no medical practitioner was in attendance, the Sanitary Authority caused handbills, setting forth the duties and liabilities of the householder in this regard, to be distributed from house to house throughout the borough in January, 1897. This distribution was effected through the agency of the local police. It is the opinion of the Medical Officer of Health and of the Inspector of Nuisances that few cases occurring in the borough failed to be notified, whether by the medical attendant or by the householder. Certain data in support of this opinion will, along with my comments thereon, be found in an Appendix to this report.

(b.) *Information from the School Authorities.*—For some four or five years past an arrangement has obtained between the School Attendance Officer and the Inspector of Nuisances, whereby the former reports to the latter official the names and addresses of all children absent from school by reason of illness regarded by the School Attendance Officer as likely to be infectious sickness, as for instance measles.

(c.) *Information from other sources.*—During the past three or four years it has been the custom for the Officer of the Society for the Prevention of Cruelty to Children, in Lancaster, to inform the Inspector of Nuisances of the existence of cases of sickness regarded by him as probably of an infectious nature.

The information obtained in one or other of the three foregoing ways has, the Inspector of Nuisances informs me, been supplemented, in regard of each invaded dwelling, and as a result of personal inquiry by himself, by facts as to source of infection ; and now and again he has made house to house visitation in the invaded neighbourhood with a view to detection of other attacks which had gone unrecorded.



## 2. *Measures adopted with a view to preventing spread of Measles within invaded dwellings.*

Throughout the whole of the recent outbreak, dwellings ascertained by the Sanitary Authority to have become invaded by measles, were visited by the Inspector of Nuisances. This officer gave verbal instructions that isolation of the sick person should be practised as far as the circumstances of the household would permit, and advocated the use of disinfectants for various purposes in the sick room: also he informed the householder that certain disinfectants could be obtained at the Health Office, free of charge. Before departure, he left with the householder a printed card embodying the instructions which he had given verbally. Second visits to invaded houses were rarely made unless the disease was known to be extending within the dwelling. No disinfection of dwellings which had been invaded by measles was practised.

The Borough of Lancaster is provided with a hospital for infectious diseases. It is a stone building, erected in 1891, and consists of two pavilions of two wards each, of a convalescent ward, of an administrative block, and of outbuildings. At the rate of 2,000 cubic feet of air-space per bed, it would afford accommodation for 18 patients. During the recent measles prevalence no persons suffering from that disease were sent to hospital.

The Sanitary Authority possess a high pressure steam disinfecting apparatus. They did not, however, in any instance cause infected articles in dwellings that had been invaded by measles to be disinfected at the close of the illness.

## 3. *Measures adopted with a view to checking extension of the disease throughout the borough.*

(a.) *Information furnished to School Authorities.*—The Sanitary Authority systematically informed the School Attendance Officer and also the teacher of the school concerned, whether a public elementary school or a private school, as to the name and address of every known case of measles occurring in families of which members attended school. Similar information, however, was not afforded to teachers of Sunday schools.

(b.) *Exclusion from School of members of households invaded by Measles.*—Children suffering from measles, and all members of households known to be invaded by measles, were excluded from school, by the Sanitary Authority and the School Authorities acting in conjunction, until four weeks after the occurrence of a case of this disease in the family.

(c.) *School closure.*—With two exceptions, all public elementary schools in the borough were closed, with a view to check extension of measles, from February 4th to April 5th, 1897. These schools were closed in virtue of powers under Article 88 of the Code of Regulations approved by the Lords of the Committee of Council on Education. The Corporation are also empowered, by their Act of 1880, to “order public or private day schools, or places of public resort, situate in neighbourhoods affected by infectious disease, to be temporarily closed or suspended.” No private day schools nor Sunday schools were closed at the instance of the Sanitary Authority with a view to checking extension of the measles epidemic.

(d.) *Other measures.*—There are two public libraries in Lancaster, and the Sanitary Authority systematically furnished the librarian of each with the names and addresses of all persons known to be suffering from measles, with a view to members of the invaded households not being supplied with books until this might be done with safety. The Sanitary Authority, however, did not further inform the librarians as to when these households might be regarded as free from infection.

## ORIGIN AND PROPAGATION OF THE OUTBREAK.

As already stated, not more than 38 cases of measles are known to have occurred in Lancaster during the first 10 months of 1896, and during November of that year no case is ascertained to have occurred. Locally, the recent outbreak is believed to have originated with a child, notified on December 5th, who had



recently come from another district where measles was at the time epidemic. I myself was unable to trace any connection, save in one instance, between this child and the other cases which occurred later in December. Indeed, inquiry concerning possible infection from case to case as regards these earlier attacks gave, in almost all instances, a negative result, and I was unable to discover anything that could justify belief that the source of the outbreak was the imported case of December 5th. Rather with my investigations came suggestion that the disease had not really been extinct in November and early December in Lancaster, and that to scattered cases about that time, whether known to the Sanitary Authority or not, the attacks between December 16th and 28th, which appear to have formed points of origin of the outbreak which followed, were to be referred. In this connection it is perhaps significant that the cases notified in December, up to the 28th of the month, were not restricted to one particular part of the town, but were scattered somewhat widely. After December the progress of the epidemic was rapid, and soon the whole of the town, save a small part lying to the north of the river which flows through Lancaster, was affected. The town, however, although generally affected, did not suffer equally in all its parts. The incidence of measles was heavier on certain newer portions of the town, largely composed of working-class houses of the better sort, than on older Lancaster, where, along with working-class houses there are many business premises and residences where the juvenile population is likely to have been scantier.

As to the manner of propagation of the disease, the facts which came under my observation tend to suggestion that in January and earlier February the rapid extension of the epidemic was aided by schools. Fuller account, however, of the measles in this aspect, along with discussion of the question as to what influence may have been exerted on the course of the epidemic by the closure, already referred to, of certain schools, will be found in an Appendix to this Report.

Other opportunity, however, in addition to that afforded by schools, for the extension of the disease, is to be found in the numerous possibilities of personal communication between sick and healthy. And here there is room for criticism of the Sanitary Authority's administration. Though there was less house-to-house inquiry in invaded neighbourhoods than was perhaps needful, yet their methods of obtaining information as to occurrence of measles in their district would seem to have been, in the main, well considered. The issue of a notice to every householder, in the early stages of the epidemic, calling his attention to his duty as regards informing the Authority of existence of measles in his family, is to be commended, and is to be thought of as having been attended with good results (*see* Appendix A). But the arrangements for obtaining information from the School Authorities were somewhat defective: inasmuch as information from the School Attendance Officer, who visits his schools only once a week for the purpose of ascertaining what children are absent, might clearly be a week, or even more, in arrear as to occurrences of measles among children attending these schools. The Sanitary Authority, I understand, are now making arrangements whereby they will be informed directly by the responsible teachers of schools as to suspected measles, or other infectious sickness, among their scholars. So far, the Town Council's methods with measles were not unsatisfactory. But it is otherwise with the measures taken by them with a view to prevent spread of measles in invaded dwellings.

It is true that their Inspector of Nuisances visited all houses known to be invaded by measles, and gave the instructions already detailed, but subsequent visits, with a view to seeing that the precautions recommended were being observed, were rarely made. Indeed, from what I was able to gather during my visit to Lancaster, the sick and the healthy would seem to have commonly occupied the same room. For this scanty supervision of invaded dwellings blame cannot be held to attach to the health staff, which consists only of a Medical Officer of Health, who is also engaged in private practice, and an Inspector of Nuisances, who is also Inspector of Nuisances to the Port of Lancaster, and Superintendent of Scavenging in the Borough. On these two officers devolve all the duties connected with the care of the health



of a population of 38,000 persons. I learned that the mere paying of a single visit to each dwelling invaded by measles entailed on the Inspector of Nuisances, during the height of the epidemic, work which occupied him daily till nine or ten o'clock at night.

Notwithstanding that means of isolation at home would seem to have frequently been wanting, no cases of measles were removed to hospital. It is, perhaps, more than may at present be looked for that an Authority should provide accommodation in hospital sufficient to cope with an epidemic of measles at its height. But in the earlier stages, at least, of measles prevalence, isolation in hospital of persons attacked might well be attempted, in the hope of thus averting an epidemic.

In the matter also of final disinfection of invaded dwellings and of infected articles therein, the Lancaster Corporation failed in their duty. They possessed the necessary means of efficient disinfection, but they made no use of them. For this failure, probably, the inadequacy of the health staff provided by the Corporation is in large degree responsible.

In regard of such measures as affording information to School Authorities, excluding from school members of households invaded by measles, closure of schools, and taking precautions against dissemination of measles by books sent from public libraries, the efforts of the Corporation, although not free from ground for criticism, were more satisfactory. They omitted, indeed, to afford to teachers of Sunday schools information of the sort given to teachers of public elementary and private schools. Again, when it appeared to them that certain public elementary schools should be closed, they do not seem to have made any effort to procure closure of corresponding Sunday schools, although the fact that the latter were remaining open was to be thought of as tending to neutralise any benefit that might be looked for from the closing of the former.

While, therefore, the Corporation of Lancaster made endeavour to deal with the recent epidemic of measles in their district, yet in several respects they fell short of their duty in this regard. Many of these shortcomings would probably have been avoided had the Corporation had a health staff sufficient to discharge the duties involved in attempt to control an epidemic of measles. But the present staff cannot be regarded as adequate to the duties that ordinarily devolve upon it; much less is it adequate when these duties are largely added to by an epidemic of measles.

The Corporation of Lancaster should, therefore, provide for the borough a health staff sufficient for the ordinary needs of the district: to be temporarily increased, if necessary, in epidemic times in such degree as would tend to discovery of unrecorded cases and render practicable the adoption and maintenance of proper precautions against the spread of the current infection within invaded dwellings, and throughout their district. They should also take into consideration the advisability of extending their hospital accommodation to such degree as would enable them to remove thither for isolation, cases of measles in inter-epidemic periods at least. Having regard, moreover, to the value of prompt notification of measles, under a proper system of local administration, especially in inter-epidemic periods, the Corporation will do well to consider whether they should not take steps to again extend their Act of 1880 to measles, either permanently or for a considerable term of years.

I desire to express my sense of obligation to the Corporation of Lancaster and to their officials for assistance in connection with my Inquiry. More especially I would thank Mr. G. R. Parker, Medical Officer of Health, Mr. F. W. Smith, Inspector of Nuisances, and Mr. Noar, School Attendance Officer, for the aid, statistical and other, which they afforded me in regard of the matter of that Inquiry.

THEODORE THOMSON.

*December 1st, 1897.*

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APPENDIX A.

NOTIFICATION OF MEASLES IN THE BOROUGH OF LANCASTER.

As stated in the body of this Report measles became compulsorily notifiable in the Borough of Lancaster in 1888 : and, although this procedure ceased to be compulsory early in 1895, yet measles has continued to be notified to the Corporation as before. As already noted, the number of cases of the disease which came to the knowledge of the Authority in the recent epidemic, between December 5th 1896 and July 15th 1897, amounted to 1,185. The sources of this knowledge are shown in the following figures :—

Cases reported by medical attendants only ...	...	...	...	672
Do. do. parents only ...	...	...	...	461
Do. do. both parents and doctors ...	...	...	...	49
Do. discovered otherwise ...	...	...	...	3
Total ...				<u>1,185</u>

These figures are of interest by reason of the considerable number of instances in which notification was received from the householder : these amounting to 510 out of 1,185, or 43 per cent. of the total.

It has been matter of frequent comment on “ dual ” notification that the duality is apt to be something of a fiction : the householder failing usually to discharge the duty incumbent upon him to inform the Sanitary Authority of the existence of infectious disease in his dwelling. This failure on the part of the householder has not usually been regarded as of material consequence in respect of diseases for which medical attendance is wont to be deemed a necessity ; inasmuch as the Authority receive the requisite information from the medical attendant. But, in regard of measles, which is thought by many persons not to call for medical treatment, notification by the householder becomes, by reason of this condition, of considerable importance. And this failure by the householder to notify existence of infectious disease in his dwelling has frequently led, in respect of measles, to ignorance, on the part of Sanitary Authorities, of so many cases of the disease in districts invaded by it, as to give rise to question of the value of compulsory notification as a source of information of its existence. In Lancaster, however, as indicated by the foregoing figures, notification by the householder was, in the recent epidemic, of considerable amount : and, as already stated in the body of this Report, the local health staff believe that, during that epidemic, but few cases of measles failed to be notified to the Authority, whether by the medical attendant or by the householder. It is possible that the considerable proportion of cases notified by the householder is referable to the distribution from house to house throughout the borough by members of the local police force, early in January of the present year, and in the early stages of the epidemic, of the following notice :—

The Inspector's Office is open daily from 9.30 to 10.0 and 5.0 to 5.30 ; Saturdays, 12.0 to 12.30.

BOROUGH OF LANCASTER.

INFECTIONOUS DISEASES.

NOTICE IS HEREBY GIVEN

that in accordance with the Lancaster Corporation Act, 1880 :

1. Any person having the management or control of any building in which a

CASE OF INFECTIONOUS DISEASE

occurs, or the person in charge of such case shall, so soon as he shall become aware of the existence of such disease,

FORTHWITH GIVE NOTICE THEREOF

to the Inspector of Nuisances at his office in the Market Hall.

2. The following are Infectious Diseases within the meaning of the above Act :

Small pox

Cholera

Diphtheria

Typhus Fever

Enteric or Typhoid Fever

Relapsing Fever

Puerperal Fever

Scarlet Fever

Measles

Rotheln

3. Any person offending against the above Enactment shall for every such offence be liable to a

PENALTY not exceeding FIVE POUNDS.

W. O. ROPER,  
Town Clerk.



January, 1897, however, was not the first occasion on which a similar notice regarding notification of measles had been, in like manner, distributed throughout the district. This procedure had been adopted in other years ; as will be seen from the subjoined table, in which are set out revised data furnished to me regarding the total number of known cases of measles year by year in Lancaster, subsequent to 1888, when the disease became compulsorily notifiable, with the numbers in each instance notified by householders and by medical attendants.

Cases of Measles	* 1889	1890	1891	† 1892	1893	1894	** 1895	1896
Reported by Householders ... ..	407	14	21	222	246	9	663	18
Reported by Medical Attendants ...	894	75	78	499	326	37	705	40
Reported by both Householders and Medical Attendants.	14	1	1	25	23	—	36	—
Discovered otherwise ... ..	—	1	11	6	14	—	1	—
Totals ... ..	1,315	91	111	752	609	46	1,405	58

\* Notice as to householder's duty to notify issued in January or February.

† Notice as to householder's duty to notify issued in December.

\*\* Notice as to householder's duty to notify issued in January.

From these figures it appears that the proportions of known cases notified by the householder during the years 1889-96 were as follows.—

1889	...	32	per cent.	(Epidemic, January—May).
1890	...	16	do.	
1891	...	20	do.	
1892	...	33	do.	(Epidemic, January—April : and November—December).
1893	...	44	do.	(Epidemic, January—June).
1894	...	20	do.	
1895	...	50	do.	(Epidemic, January—August).
1896	...	31	do.	

In the 1897 epidemic, as already noted, the proportion notified by householders was 43 per cent. of the known cases.

The proportion of notification by the householder in the epidemics of 1893, 1895, and 1897, was, it will be seen, markedly greater than in that of 1889 ; a fact, perhaps, referable to the greater familiarity of householders with their obligations in consequence of the repetition of notices. It would seem also that the proportion of notification by the householder tends to be less in inter-epidemic periods than in epidemic periods. If this should be due to greater neglect by the householder of his duty in regard of measles notification in times when measles is not epidemic, it may be a question worthy of consideration whether advantage might not arise from periodically stimulating the householder as to the need for notifying measles, in place of issuing notices only at the commencement of an epidemic. For it is in inter-epidemic periods that full information as to the existence of measles in the district is of special value ; since complete knowledge of the sort, combined with appropriate preventive measures, may hinder the disease from becoming epidemic.

In considering, however, the value of notification by the householder in Lancaster, as indicated by the foregoing figures, it has to be borne in mind that this value will differ according to the circumstances under which notification has taken place. It will be remembered that in Lancaster there is in force, as set out on page 3 of this Report, a provision whereby “ only one fee shall become payable within an interval of thirty days to the same medical practitioner for certificates given by him in respect of the same disease occurring in the same building.” When, therefore, a dwelling has been notified by the practitioner as invaded by measles, no further cases of measles occurring in that dwelling need be notified by him to the Sanitary Authority within the month following his notification of the first case, and hence but few cases other than “ first cases ” can be thought of as being notified by the practitioner. These further cases may, however, be notified by the householder : and it is possible that the considerable proportion of notification of measles by the householder in Lancaster may have come about in this way. But it is in instances where no medical attendant has been called in that notification by the householder is of greatest value : since, but for this, foci of the disease may readily escape detection. In those instances, on the other hand, where a case of measles has been notified by the medical attendant, the dwelling may be kept under observation by the Sanitary Authority's officers : and thus, even in the absence of further notification by either medical attendant or householder, knowledge may be had of other cases occurring there. It does not appear what proportion of the notifications of measles by the householder in Lancaster were of that class from which, as indicated, most benefit is to be anticipated.



## APPENDIX B.

## AS TO WHAT AMOUNT OF CONTROL OF MEASLES, IF ANY, WAS AFFORDED BY THE CLOSING OF CERTAIN SCHOOLS IN LANCASTER DURING THE EPIDEMIC PREVALENCE OF THIS DISEASE THERE, IN 1897.

There are, within the Borough of Lancaster, 13 public elementary day-schools, affording accommodation for 6,646 children. There are also, it is computed, some 30 private schools, with a total attendance of 500 to 600 children : of which number nearly half are children attending the Grammar school and the Friends' school, the other private schools being of small size. Details as to the number of Sunday schools in Lancaster, and of the attendance thereat, were not forthcoming.

All public elementary day-schools closed for the Christmas holidays on December 22nd or 23rd, 1896, and re-opened on January 11th, 1897. Private schools also closed for these holidays ; but for what number of days in each instance I cannot state. Sunday schools did not close during the Christmas period.

All public elementary day-schools in the Borough, save two, were closed, at the instance of the Sanitary Authority, from February 4th to April 5th, 1897. Three or four of the smaller private schools are stated to have voluntarily closed for a short period about this time. No Sunday schools were closed.

With a view to appreciating what, if any, effect on the course of the epidemic may have been produced by these closures of schools, a record of known cases of measles, at first in daily and afterwards in weekly periods, is here appended ; together with the times during which schools were closed.

							Cases of Measles.
On December 5, 1896	...	...	...	...	...	...	1
" " 16	"	...	...	...	...	...	1
" " 17	"	...	...	...	...	...	1
" " 18	"	...	...	...	...	...	2
" " 24	"	...	...	...	...	...	1
" " 28	"	...	...	...	...	...	2
" " 29	"	...	...	...	...	...	3
" " 30	"	...	...	...	...	...	4
" " 31	"	...	...	...	...	...	5
During the week ending January 7, 1897							14
" " " 14	"	...	...	...	...	...	72
" " " 21	"	...	...	...	...	...	70
" " " 28	"	...	...	...	...	...	107
" " February 4	"	...	...	...	...	...	112
" " " 11	"	...	...	...	...	...	138
" " " 18	"	...	...	...	...	...	116
" " " 25	"	...	...	...	...	...	123
" " March 4	"	...	...	...	...	...	61
" " " 11	"	...	...	...	...	...	54
" " " 18	"	...	...	...	...	...	40
" " " 25	"	...	...	...	...	...	33
" " April 1	"	...	...	...	...	...	23
" " " 8	"	...	...	...	...	...	15
" " " 15	"	...	...	...	...	...	7
" " " 22	"	...	...	...	...	...	16
" " " 29	"	...	...	...	...	...	32
" " May 6	"	...	...	...	...	...	19
" " " 13	"	...	...	...	...	...	20
" " " 20	"	...	...	...	...	...	22
" " " 27	"	...	...	...	...	...	7
" " June 3	"	...	...	...	...	...	5
" " " 10	"	...	...	...	...	...	19
" " " 17	"	...	...	...	...	...	3
" " " 24	"	...	...	...	...	...	15
" " July 1	"	...	...	...	...	...	8
" " " 8	"	...	...	...	...	...	6
" " " 15	"	...	...	...	...	...	8
Total, December 5th, 1896 to July 15th, 1897							1,185

All public elementary schools closed from December 22 or 23 until January 11th for Xmas holidays. Private schools closed for uncertain period. Sunday schools not closed.

All public elementary schools closed save two from February 4 to April 5. Two or three small private schools closed about this time. No Sunday schools closed.

In regard of inference from these figures as to influence of schools on measles prevalence at the Christmas period, it is to be noted that the first marked increase of measles took place during the last four days of December and the first week of January : a fact compatible with the public elementary schools, which did not close until December 22nd or 23rd, having operated in dissemination of the disease.

But the great increase of cases in the fortnight immediately following cannot be attributed to spread of the disease by public elementary schools, since these had remained



closed until January 11th. It must be borne in mind, however, that any good results that might be looked for from public elementary schools remaining closed during this period would be apt to be neutralised: firstly, by the Sunday schools remaining open, and, secondly, by the numerous re-unions of children that are wont to take place at the Christmas season.

The disease, as shown in the figures given above, continued to increase rapidly during January, and, accordingly, on February 4th, all public elementary schools in the borough, save two, were closed at the instance of the Sanitary Authority, and they remained closed until April 5th. The two public elementary schools that were not closed are situated in a small part of Lancaster lying to the north of the river that flows through the town, a neighbourhood which was, at this time, almost free from measles. As already stated, two or three small private schools closed about this time: but no Sunday schools were closed. Three weeks after closure of the public elementary schools a marked decrease ensued in the amount of measles in the district, a decrease which continued until the week ending April 22nd, when, as well as in the four following weeks, there was again some increase. It is noteworthy that this recrudescence of the disease occurred some two weeks after the re-opening of the public elementary schools. It was not, however, a long sustained increase: and measles diminished again during June and July, possibly owing to the adverse seasonal influence believed to be exerted on the disease about this time of year. By mid-July it had ceased to be regarded as epidemic.

The marked decrease noted as having occurred within three weeks of the closure of schools on February 4th, tends to suggestion that this measure had a repressive influence on the course of the epidemic: while its recrudescence within a fortnight of their re-opening, though comparatively slight, is consistent with facilities having been afforded by schools for further propagation of measles.

I append here certain figures, based on data furnished to me by Mr. F. W. Smith, the Inspector of Nuisances of the Borough of Lancaster, which indicate, to some extent, the influence of schools in serving to spread measles among the community. The 1,185 cases of measles, that are known to have occurred between December 5th and July 15th, are divided into four categories, viz.:

Class A.—Children attending a public elementary school.

Class B.—Children attending a private school.

Class C.—Children, not themselves attending school, but belonging to a family of which members attend school.

Class D.—Children not attending school, nor belonging to a family of which any member attends school.

The numbers of attacks in each of these four classes of children are given week by week, from the week ending December 10th, 1896, to the week ending July 15th, 1897, as follows:—

Week ending	CLASS A. Children at- tending P.E. school.	CLASS B. Children at- tending private school.	CLASS C. Children having relatives at school.	CLASS D. Children en- tirely uncon- nected with school.	Total.
December 10 ... ..	—	—	—	1	1
„ 17 ... ..	2	—	—	—	2
„ 24 ... ..	1	—	—	2	3
„ 31 ... ..	12	—	2	—	14
January 7 ... ..	13	—	1	—	14
„ 14 ... ..	57	2	7	6	72
„ 21 ... ..	41	1	19	9	70
„ 28 ... ..	77	—	15	15	107
February 4 ... ..	91	—	15	6	112
„ 11 ... ..	65	—	44	29	138
„ 18 ... ..	53	—	37	26	116
„ 25 ... ..	56	3	32	32	123
March 4 ... ..	16	1	30	14	61
„ 11 ... ..	13	1	23	17	54
„ 18 ... ..	8	8	17	7	40
„ 25 ... ..	6	7	15	5	33
December 10—March 25 ...	511	23	257	169	960



Week ending					CLASS A. Children at- tending P.E. school.	CLASS B. Children at- tending private school.	CLASS C. Children having relatives at school.	CLASS D. Children en- tirely uncon- nected with school.	Total.
Brought forward—					511	23	257	169	960
April	1	...	...	...	3	1	12	7	23
"	8	...	...	...	2	3	7	3	15
"	15	...	...	...	3	—	3	1	7
"	22	...	...	...	11	2	1	2	16
"	29	...	...	...	19	1	6	6	32
May	6	...	...	...	8	1	8	2	19
"	13	...	...	...	7	1	8	4	20
"	20	...	...	...	6	2	10	4	22
"	27	...	...	...	4	—	2	1	7
June	3	...	...	...	—	—	2	3	5
"	10	...	...	...	11	—	5	3	19
"	17	...	...	...	2	—	1	—	3
"	24	...	...	...	7	—	6	2	15
July	1	...	...	...	4	1	3	2	10
"	8	...	...	...	1	—	3	—	4
"	15	...	...	...	6	—	2	—	8
December 4—July 15					605	35	336	209	1,185

In view of the absence of information as to the ages of the 1,185 children thus classified and as to the total number comprised in each class, it would be unwise to draw definite conclusions from these figures as to the influence of schools in dissemination of measles.

It is, nevertheless, worthy of note :

- (1) That nearly all the cases in the weeks ending December 31st and January 7th, occurred among children who had been attending public elementary schools, before these schools had closed on December 22nd or 23rd.
- (2) That the maximum incidence of attack in its class is first reached in the case of children attending public elementary schools; which may be regarded as referable to the greater facilities afforded by these schools for the dissemination of measles. The maximum incidence in Classes C. and D. occurs about two weeks after that in Class A.
- (3) That there was a sudden drop in measles prevalence in the week ending March 4th, and in weeks immediately following. This is referable, mainly, to decrease of attacks among children attending the public elementary schools, which had been closed some three weeks previously.
- (4) That there was recrudescence of measles in the week ending April 22nd, some two weeks after the re-opening of public elementary schools, and in weeks immediately following; and that this recrudescence was mainly due to increase of measles among children attending these schools.
- (5) That the chief incidence of measles on children attending private schools, of which but few were closed, occurred at a time when the epidemic was otherwise on the wane.

On the whole, these data tend to suggest beneficial influence exerted by school closure on the course of the epidemic. Indeed, the decrease of measles in the district within three weeks of school closure in February is difficult of other explanation. The time of year at which this decrease took place, namely, the month of March, is not one to suggest seasonal influence as a cause of the decrease. Nor is the number of those attacked by measles in the course of the epidemic, constituting but three per cent. of the population of the borough, of a magnitude to suggest exhaustion of susceptible material as accounting for disappearance of the disease in epidemic form from the district.



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